

## **REMARKS**

Claims 1-61 are pending in this application. Claims 1-36 have been rejected and claims 37-61 have been withdrawn from consideration. Claims 1, 2, 7, 22, 24, 25, 29, 37, 40, 56, 59, and 60 have been amended. These amendments do not introduce new matter and find support in the specification. Support for the amendments may be found as follows:

<b>Claim</b>	<b>Support</b>
1	page 22, lines 18-23
2	page 22, lines 18-23
7	claim 4
22	page 24, lines 10-19
24	page 22, lines 18-23; page 24, lines 10-19; page 25, lines 1-10
25	page 25, lines 16-18
29	claim 25
37	page 22, lines 18-23
40	page 22, lines 18-23
56	page 24, lines 10-19
59	page 22, lines 18-23; page 24, lines 10-19; page 25, lines 1-10
60	typographical error

Claim 28 has been canceled. The Examiner has acknowledged Applicants' election of Group I, claims 1-36, with traverse.

## **II. Restriction Requirement**

The Examiner reiterated the previously issued restriction requirement:

Groups I: Claims 1-36, drawn to an electrochemiluminescence cell with an electrode of platinum, iridium, or rhodium and alloys thereof;

Group II: Claims 37-58, drawn to an electrochemiluminescence assay at an electrode of platinum, iridium, or rhodium and alloys thereof;

Group III: Claims 59-61, drawn to a method of conducting an electrochemiluminescence assay comprising an electrochemiluminescence label and coreactant.

While Applicants traverse the restriction requirement, they affirm their provisional election to prosecute Group I, claims 1-36, drawn to an electrochemiluminescence cell with an electrode of platinum, iridium, or rhodium and alloys thereof.

Applicants believe that this restriction requirement is improper. The law requires that both (1) the inventions are independent and distinct, and (2) there would be a serious burden on the Examiner if the restriction was not required.

M.P.E.P. § 803.

In order to show that a process and apparatus are independent and distinct, the Office must establish that the process as claimed can be practiced by another materially different apparatus or by hand, or apparatus of the invention can be used to practice another materially different process. See MPEP § 806.05(3). The Office has stated "In this case, the apparatus can be used to practice another and materially different process such as one where the process does not include electrochemiluminescence." The Office, however, has not indicated what other non-ECL processes can be conducted in the ECL cells of the invention. Inventions of Group II, a method of conducting an electrochemiluminescence assay at an electrode of platinum, iridium, or rhodium and alloys thereof, and Group III, a method of conducting an electrochemiluminescence assay comprising an electrochemiluminescence label and coreactant, are methods of using the invention

of Group I (the inventive electrochemiluminescence cell), and the Office has not asserted any other uses for the inventive ECL cell of the invention.

Additionally, the Examiner has focused on only the first part of this two-part test. In order to properly restrict the groups, the Examiner needs to show that there would be a serious burden in examining the claims together. Applicants believe it would not be burdensome to examine the claim together given the commonality of elements in the claims.

Therefore, Applicants believe that the restriction requirement is not proper and there would not be a serious burden in examining the groups together. Thus, Applicants request that the restriction requirement be withdrawn.

### **III. Claim Objections**

The Examiner has objected to claims 5, 6, and 12 under 37 CFR 1.75(c) as allegedly being of improper dependent form because they fail to further limit the subject matter of a previous claim.

Applicants respectfully traverse this objection. Composition or apparatus claims can be defined both in terms of their structure and their function. In fact, the MPEP indicates that it is not wrong to do so. The MPEP states:

There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself render a claim improper. A functional limitation must be evaluated and considered, just like any other limitation of the claim, for what is fairly conveyed to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step.

MPEP § 2173.05(g).

Claims 5, 6, and 12 recite functions of the claimed electrochemiluminescence cell. These claims are supported by exemplary embodiments disclosed in the Examples. In particular, Example V supports claims 5, 6, and 12. See e.g., Example V.A. and Example V.D.

Claims 5, 6, and 12 do limit the scope of the claims from which they depend. For example, claims 5, 6, and 12 provide useful limitations on working electrodes in ECL reaction, but are not necessary for counter electrodes. See specification, page 20, line 19 through page 21, line 4. The electrodes of claim 1 may be either working electrodes or counter electrodes. For at least these reasons, the rejection should be withdrawn.

#### **IV. Claim Rejections Under 35 U.S.C. § 112**

The Examiner has rejected claims 5-19 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as their invention. The Examiner has reiterated that claims 5, 6, and 12 do not properly limit the preceding claims and pointed out that claims 7-11 are dependent on the rejected claims, thus rejecting claims 7-11 as well.

Here again, the applicants respectfully traverse this rejection. As discussed in the section immediately preceding this one, functional limitations are an acceptable way of defining the invention. For at least the reasons mentioned above, claims 5-19 are proper, and the rejection should be withdrawn.

**V. Claim Rejections Under 35 U.S.C. § 102**

The Examiner has rejected claims 1-3 and 22-24 under 35 U.S.C. § 102(b) as allegedly anticipated by *Niyama* (U.S. Pat. No. 5,993,740, "*Niyama*"). *Niyama* discloses an immunoassay method and analyzer by which, when magnetic particles are used as the solid phase, a luminescence from the solid phase can be measured with high sensitivity. The Examiner notes that *Niyama* discloses that the electrodes may be made of platinum, iridium, tungsten and alloys thereof.

Claims 1, 4, 7, 22, 24, 37, 56, and 59 have been amended. The presently amended claims are not anticipated by *Niyama*. In particular, *Niyama* does not teach or even suggest the 5-50% range for the second component in the alloy. The second element could be present at a lower percentage, such as 1%, as the Examiner indicated was possible.

The applicants respectfully traverse this rejection. With respect to claims 2, 3, and 23, *Niyama* does not teach or even suggest the specific secondary metals of claims 2 and 23, nor does it indicate to any extent other metals that the alloys may contain. Because *Niyama* is silent to the identity of the alloy compositions, at best, this reference may make the alloys of claims 2, 3, and 23, obvious *to try*, but certainly not anticipated or obvious in view of *Niyama*. For at least this reason, this rejection should be withdrawn.

**VI. Claim Rejections Under 35 U.S.C. § 103**

**A. Rejection over *Niyama***

The Examiner has rejected claims 4-9 under 35 U.S.C. § 103(a) as being unpatentable over *Niyama*. The Examiner alleges that "[i]t would have obvious to

modify the *Niyama* device to include an alloy of platinum with a second weight percent in the range of 1% to 80% through use of different platinum alloy compositions made from the materials disclosed by *Niyama*.” As mentioned above, *Niyama* does not teach or even suggest the specific secondary metals of the present invention. An alloy is defined as a “solid or liquid mixture of two or more metals, or of one or more metals with certain nonmetallic elements. . .” Richard J. Lewis, Sr., Hawley’s Condensed Chemical Dictionary 36 (John Wiley & Sons, 2001). Based on this broad definition, one of skill would have to choose from among many possible alloy species to arrive at the presently claimed electrodes. The generic disclosure of *Niyama* may not render the present invention unpatentable. See *In re Baird*, 16 F.3d 380, 29 U.S.P.Q.2d 1550 (Fed. Cir. 1994). Furthermore, *Niyama* does not teach or suggest that the weight percent of the second element is from 5% to 50%, as the claims now require.

Additionally, Figure 10 and Example IV (specification, page 48, lines 18-21) of the present application show that tungsten, one of the metals suggested by *Niyama*, will not work as an electrode in an ECL cell, because “...W [tungsten] apparently form[s] self-passivating oxides; and the formation of oxides accounts for the very low current densities observed in FIG. 10.” As described in the specification, page 16, lines 3-12 and elsewhere in this application and known in general, current is required for electrochemiluminescence. Thus, the teaching in *Niyama* is flawed and actually teaches away from the electrodes of the present invention.

Furthermore, in Figure 10 and Figure 11, and in the specification on page 48, line 22 through page 49, line 8, the application states that pure iridium electrodes

would not satisfy the functional limitation of claim 6. Consequently, iridium electrodes would not be expected to function well as a working electrode. Pure iridium electrodes are also taught by *Niyama*. Thus, the teaching in *Niyama* is flawed and would dissuade readers from experimentation.

Moreover, *Niyama* states in column 5 line 26: "The reason of using such a material is to prevent wear and corrosion of the electrode surface caused respectively by the electrode reaction and reagents flowing over the electrode to the extent possible." In the present application, Applicants demonstrate improvements, among other things, in using alloys of platinum and/or iridium over and beyond pure platinum. *Niyama* does not state or imply that alloys would be superior to the pure metals in his list. Further, in the examples of *Niyama* platinum was used for both the working electrode (column 8, line 40) and counter electrode (column 8, line 55). Here again, *Niyama* teaches away from using alloys. For at least these reasons, the rejection should be withdrawn.

**B. Rejection over *Niyama* in view of *Christensen***

The Examiner has rejected claims 20 and 21 under 35 U.S.C. 103(a) as being unpatentable over *Niyama* in view of *Christensen* (U.S. Patent No. 6,036,840, "*Christensen*"). The Examiner concedes that *Niyama* does not disclose the use of rhodium or rhodium alloy electrodes but points out that "*Christensen* discloses that the working electrode comprises an electrically conductive material such as a metallic material selected from the group of metals include Rh (rhodium) and alloys thereof, such that the working electrode has good catalytic effect towards many kinds of electrochemical reactions. . ." The Examiner alleges that it would have

been obvious to combine the teachings of *Christensen* with those of *Niyama* to arrive at the presently claimed invention. As highlighted above *Niyama* does not disclose the use of rhodium or a rhodium alloy as materials for its electrode.

Furthermore, the list of permissible alloys discussed in *Niyama* does not contain any broadening language—instead it only lists specific metals and indicates that alloys of those metals can be used. Reading *Niyama* would lead one of skill to believe that he must choose from the short list of six metals and corresponding alloys thereof.

Although *Christensen* discloses the use of rhodium and rhodium alloys as electrodes, it would not have been obvious to combine its teachings with those of *Niyama* to arrive at the present invention. Likewise, one of skill would not have had a reasonable expectation of success by combining the *Christensen* electrodes with the *Niyama* ECL. This lack of obviousness and expectation for success stems from the fact that *Christensen* teaches a reactor for electrochemical conversion of a material and is not directed to ECL. More specifically, *Christensen* discloses that the technical field of its invention relates to removing soot particles from flue gases and diesel engines. See *Christensen*, col. 1, lines 24-57. The skilled artisan in the field of electrochemiluminescence detection would not likely be cognizant of the unrelated teaching of *Christensen*. Therefore, there would be no motivation to one of skill in electrochemiluminescence to combine these references.

Furthermore, as mentioned above tungsten and iridium electrodes do not function well as working electrodes, and therefore the Examiner's allegation that an electrode that has good catalytic effect towards many kinds of electrochemical



reactions is not necessarily true for all electrochemical reaction. For at least these reasons, the rejection should be withdrawn.

**C. Rejection over *Wohlstadter***

The Examiner has rejected claims 25-32 under 35 U.S.C. § 103(a) as being unpatentable over *Wohlstadter* (U.S. Patent No. 6,207,369, "*Wohlstadter*"). The Examiner acknowledges that *Wohlstadter* does not disclose a specific embodiment with the field extending electrodes but believes this would have been an obvious modification. Applicants respectfully traverse this rejection.

The rejected claims require that the counter electrode has a field extending element and that the field extending element is interposed between the transparent portion of a support and the working electrode. While *Wohlstadter* does teach field extending electrodes, having either wires/whiskers or indentations/wells to increase the surface area of the electrode and extend its electrical field, it does not teach this particular orientation of the ECL cell structures in *Wohlstadter*. In fact, Figure 19 of *Wohlstadter* illustrates that no light radiating perpendicularly from the working electrode of *Wohlstadter* Figure 19 would hit the counter electrode. Thus, no part of the counter electrode can be considered to be interposed between the working electrode and the transparent portion of the support, as required by claim 25.

With respect to claim 31, *Wohlstadter* does not teach or describe the limitation "capable of maintaining said counter electrode at a constant potential or at a potential that does not vary relative to a potential of said light detector." As described in the present specification on page 35, lines 5-13, this structure is advantageous by reducing "the noise component of the signal produced by the light

detector during an ECL measurement that results from capacitive coupling of the electrodes to the light detector.” *Wohlstadter* does not teach or suggest this limitation.

The Office has not addressed either limitation, nor does the Office point to any particular structure in *Wohlstadter* to provide any further basis for these conclusions. The initial burden is on the Examiner to establish a prima facie case of obviousness. In establishing the rejection “[t]he examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” MPEP 2142 (citations omitted). Because the Examiner offers no explanation for his conclusion of obviousness, this rejection is improper and should be withdrawn.

**D. Rejection over *Niyama* in view of *Wohlstadter***

The Examiner has rejected claims 10-19 and 33-36 under 35 U.S.C. § 103(a) as being unpatentable over *Niyama* in view of *Wohlstadter*. The Examiner concludes that “[i]t would have been obvious to modify the *Niyama* device to include a transparent support and a flow cell such as taught by *Wohlstadter* in order to provide a support of a suitable material to observe reactions inside the electrochemiluminescence cell and to provide a flow cell for commercial applicability.”

Applicants respectfully traverse this rejection. With respect to claims 10-19, these claims depended from claims previously rejected over *Niyama* alone which rejection was addressed above. *Wohlstadter* does not teach electrodes made of any alloys. Therefore, *Wohlstadter* does not compensate for any of the prior deficiencies

of *Niyama* regarding the electrodes. Therefore, combining *Niyama* and *Wohlstadter* does not render claims 10-19 unpatentable for the same reasons presented above.

Regarding claim 11, this claim also contains the limitation that the counter electrode comprises at least one field extending element interposed between said transparent portion and said working electrode. As discussed above, *Wohlstadter* does not teach or suggest this particular arrangement of ECL cell components, nor does the Examiner suggest that *Niyama* compensates for this deficiency.

Claims 33-36 depend from claims 31-32, which were addressed above. Because *Wohlstadter* does not teach or even suggest the arrangement of the elements of the ECL cells of claims 31-32, these dependent claims cannot be obvious, regardless of what *Wohlstadter* teaches above the additional limitations in the dependent claims. Additionally, with respect to claim 31, neither *Wohlstadter* nor *Niyama* teach or describe the limitation "capable of maintaining said counter electrode at a constant potential or at a potential that does not vary relative to a potential of said light detector." As described in the specification on page 35, lines 5-13, this structure is advantageous by reducing "the noise component of the signal produced by the light detector during an ECL measurement that results from capacitive coupling of the electrodes to the light detector." *Wohlstadter* and *Niyama* both have sources of electrical energy attached to the electrodes, but none describe the configuration in the aforementioned limitation. Therefore, Applicants request that this rejection be withdrawn.

#### **E. Rejection over *Liljestrand* and *Niyama***

The Examiner has rejected claims 1-36 under 35 U.S.C. § 103(a) as being obvious over *Liljestrand* (U.S. Patent No. 6,200,531, "*Liljestrand*") in view of *Niyama*. According to the Examiner, *Liljestrand* teaches an apparatus for carrying out electrochemiluminescence tests measurements. The apparatus includes a flow cell that comprises a counter electrode, ECL test chamber, working electrode, and the flow cell includes a main housing formed of a transparent chemically inert material. Although the Examiner concedes that *Liljestrand* does not teach that the electrodes are platinum or iridium alloys, he concludes that it would have been obvious to combine *Liljestrand* with *Niyama* to arrive at the present invention. Again, the Examiner is relying on *Niyama* for the limitations of claims 1-24 regarding the composition of the electrodes. As we have argued previously, *Niyama* does not teach the particular electrode compositions claimed, and the Examiner does not rely on *Liljestrand* for the electrode compositions or suggest that *Liljestrand* compensates for any of the deficiencies of *Niyama*.

Regarding claims 25 and 27, *Liljestrand* does not teach the counter electrodes as presently claimed. Specifically, the claimed electrode exclude counter electrodes that are comprised of a mesh or screen, and dependent claim 27 recites a ladder electrode not accounted for in the present rejection.

Finally, with respect to claim 31, neither *Liljestrand* nor *Niyama* teach or describe the limitation "capable of maintaining said counter electrode at a constant potential or at a potential that does not vary relative to a potential of said light detector." As described in the specification on page 35, lines 5-13, this structure is

advantageous by reducing "the noise component of the signal produced by the light detector during an ECL measurement that results from capacitive coupling of the electrodes to the light detector."

For at least the reasons detailed above regarding *Niyama*, it would not have been obvious to one skilled in the art to modify *Liljestrand* in view of *Niyama* to achieve the present invention. In addition, *Liljestrand* in view of *Niyama* does not teach or even suggest the presently amended claims. Therefore, the rejection should be withdrawn.

**VII. Conclusion**

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

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By: Rebecca M. McNeill  
Rebecca M. McNeill  
Reg. No. 43,796